

## TBI's sea-source heat pump visit

The Black Isle is surrounded by the sea, which stays at a fairly constant temperature all year round, so why don't we use the sea as a source for heat pumps, instead of drilling boreholes? A small group of us went to Gus Horsburgh's house just outside Ullapool to find out.

For those who aren't familiar with heat pumps, they work using exactly the same technology as a fridge – but whereas a fridge is mostly concerned with cooling its contents, and only slightly warms the room it's sitting in, a heat pump warms the house, and only slightly cools the "source". And the source can be air, ground or water; it doesn't have to be particularly warm, although the warmer it is, the more effective the heat pump.

Gus thinks he probably has the only domestic sea-source heat pump in Scotland. It was installed for him by a friend, so it's one of a kind. His house is perched on the edge of Loch Broom, in fact when both the tide and wind are high, the sea comes up to the bottom of his wall - so it's obvious why he was drawn to the sea-source idea.



The first problem we discussed was that the sea water needs to be pumped up to the heat pump – which means the sea water input needs to be below low water, but also ideally it needs to be close to the house. This isn't too much of a problem for Gus, as the shore slopes down steeply, so even with a 5 metre tidal range, his water input (below the buoy in the photo) is still only a few metres away.

Sea water is pumped from there by an off-the-shelf electric pump which sits on a makeshift platform on the sea bed. When it gets to the house's plant room it's filtered, then put through a heat exchanger

which provides a water/ glycol mix at the same temperature as the sea – the purpose of this is to avoid corrosive sea-water getting into the heat pump.



From that point, the system is exactly the same as any other heat pump, with the source loop being cooled, and the energy absorbed as a result used to heat water for the under-floor heating (and hot water in winter, when there's not much generated by the solar thermal panels).





In this photo, Gus is showing Penny the sea-source loop, with the stainless steel filter and the heat exchanger (powder blue). The heat pump itself, in the cupboard behind Penny, looks pretty much like the back of a fridge!

The big question is, of course, “Can this technology be applied more widely?” – and specifically, can it be applied on the Black Isle? We couldn’t really think of any local properties which are as close to a steeply-sloping sea bed as Gus is – our tidal range may be a little bit less than Ullapool, but mostly we have gently sloping beaches. But there may be a few houses adjacent to harbours, where the technology could be used – and if anyone is in that position, it would certainly be worth considering, Gus found the heat pump halved his electricity bills!